Business Groups, Innovation and Institutional Voids in Latin America

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Abstract

The paper presents an empirical analysis of the innovative activities of business groups in Latin America. It compares the innovativeness of group-affiliated firms (GAFs) and standalone firms (SAFs), and it investigates how country-specific institutional factors – financial, legal, and labor market institutions – affect the group-innovation relationship. The empirical analysis is based on the most recent wave of the *World Bank Enterprise Survey* (period 2010-2011), and it focuses on a sample of 6500 manufacturing firms across 20 Latin American countries. The econometric results point out two major conclusions. First, GAFs are more innovative than SAFs: we estimate the innovation propensity of GAFs to be 9% higher than that of SAFs. Secondly, across countries, the innovativeness of GAFs is higher for national economies with a better institutional system than for countries with a less efficient institutional set up.

Keywords: Business groups; innovation; institutional voids; emerging economies; Latin America

1. Introduction

Business groups permeate emerging economies, often accounting for a substantial share of value added and employment. A business group can be defined as "a set of firms which though legally independent, are bound together by a constellation of formal and informal ties and are accustomed to taking coordinated action" (Khanna and Rivkin, 2001: 47).

The existence, ubiquity and remarkable dynamics of business groups in emerging markets has stimulated a large amount of research, which has investigated a number of related topics such as the reasons for the emergence of groups, their ownership structure, their differentiation and vertical integration patterns, and their economic performance (Khanna and Yafeh, 2007; Colpan et al., 2010). The existing literature does on the whole provide a rich and thorough characterization of business groups and their importance for economic development. There are however two important issues and open questions that deserve further scholarly attention, and which provide the motivations for undertaking the present study.

The first is that, while there exist several studies focusing on the financial and economic performance of groups, much less is known about their strategies, i.e. how groups organize their business activities and what makes them more (or less) successful than independent enterprises. One important organizational strategy that deserves closer attention is *innovation*. The question of how business groups organize their innovative activities represents an important though unexplored area of research. A few recent studies have raised this question, and provided empirical evidence suggesting that GAFs are on average more innovative than SAFs. This is due, among other factors, to business groups' greater access to financial and human capital resources, as well as their ability to take advantage of within-group and foreign spillovers (Mahmood and Mitchell, 2004; Mahmood and Lee, 2004; Belenzon and Berkovitz, 2010).

The second question that deserves further research refers to the effects of country-specific institutional characteristics on the performance and strategies of business groups. An important argument discussed in the literature is the so-called *institutional voids thesis*. According to this, business groups originate and prosper when national institutions are weak and, correspondingly, groups performance is relatively better in countries characterized by weaker institutions than in economies with well-functioning institutional set ups (Khanna and Yafeh, 2007; Carney et al., 2011).

This argument has recently been extended by Chang et al. (2006) to the study of business groups' innovativeness. In line with the standard interpretation of the institutional voids

thesis, Chang et al. (2006)'s argument is that the positive effects of group affiliation on innovation are stronger in less developed (emerging) economies, in which groups make up for market failures and institutional weaknesses, particularly with respect to financial infrastructure, legal institutions and labor markets regulations.

These two open questions motivate and structure the present paper. Our first objective is to provide new evidence on business groups' innovative activities in Latin America, and investigate whether group-affiliated firms (GAFs) are more innovative than standalone firms (SAFs). Our second objective is to reassess the institutional voids thesis and its relevance to study the innovative activities of firms in Latin America, and analyze in particular how country-specific institutional characteristics affect the relationship between group affiliation and innovation.

The empirical analysis makes use of the most recent wave of the *World Bank Enterprise Surveys* (WBES) database, referring to the period 2010-2011. The WBES is a rich and extensive survey dataset of several thousand business firms in developing countries, providing information on their characteristics, strategies, economic performance, as well as their perceptions of the institutional, policy and economic environment in which they operate. A key characteristic of the WBES dataset is that it contains information on firms' ownership, so that we are able to identify which firms in the database are part of a domestic group, and distinguish these from the group of standalone firms.

Our study focuses on a sample of around 6500 manufacturing enterprises in 20 different countries in Latin America. The topic of business groups' innovation activities and their relationships to national institutional conditions is highly relevant for emerging economies in Latin America (Schneider, 2009). During the last two decades, many Latin American economies have undertaken extensive institutional changes and economic reforms – such as privatizations, trade liberalization, financial and macroeconomic stabilization – intended to make domestic markets more open, competitive and efficient. The new competitive environment opens up new challenges and opportunities for domestic firms in the region, and it is thus important to study how business groups are responding to the changing economic environment, and the extent to which their strategies and performance differ from those of standalone enterprises.

On the whole, the paper contributes to the literature along three main dimensions. First, we provide new evidence and quantitative analysis of business groups strategies and innovation activities. In line with the few recent studies on this topic, we find that GAFs are more

innovative than SAFs, and we estimate the innovation propensity of GAFs to be 9% higher than that of SAFs.

Secondly, we carry out a cross-country test of the institutional voids thesis and its relation to firms' innovation activities. Our results differ from those of Chang et al. (2006). We show that, across countries in Latin America, the innovativeness of GAFs is higher for national economies with a better institutional system than for countries with a less efficient institutional set up. Financial, legal and labor market institutions provide an important infrastructure sustaining business firms' innovation activities, and this enhancing effect is stronger for group-affiliated firms in well-functioning and better-organized national systems of innovation.

Finally, by making use of the extensive set of firm-level information available in the WBES database, our paper suggests a new avenue for empirical analyses in the field. We show that this dataset can be used to compare business groups' characteristics, strategies and performance for several thousand firms across the whole developing world. The results presented in this paper, therefore, can be replicated and extended in future research on business groups in emerging economies.

2. Business groups in Latin America

Business groups have for a long time been dominant players in Latin American economies. They are typically large, family-owned, hierarchically controlled and diversified. They account for a large share of value added and employment in many countries in the region. Schneider (2009) points out business groups as a key dimension of the Latin American variety of capitalism, which he defines as *hierarchical market economies*. Hierarchical market economies in Latin America, a hybrid type between the two standard categories of *liberal market economies* and *coordinated market economies* (Hall and Soskice, 2001), are in particular sustained by four main pillars (Schneider, 2009): (1) the relevance of diversified business groups, (2) a high-presence of multinational corporations, (3) low-skilled labor, (4) atomistic labor relations coupled with extensive (and often inefficient) labor market regulations (Botero et al., 2004). These four characteristics are closely intertwined and tend to reinforce each other: it is these institutional complementarities that explain why business groups constitute a structural and long-standing feature of this region.

Despite their importance, empirical data and evidence on business groups in Latin America is scant and far more limited than it is the case for other emerging economies (e.g. in East Asia). Chile is the economy in the region with a relatively better availability of information on business groups' strategies and performance. Khanna and Palepu (2000) used this information to study the relationship between diversification and the financial performance of groups in Chile in the period 1988-1996. Khanna and Rivkin (2006) analyzed the relationships between interorganizational ties, family ownership and business groups. Another important work on Chile was presented by Khanna and Palepu (1999), which investigated the evolution of 18 large and diversified groups in the period 1987-1997, and showed that deregulation and other economic reforms in this decade did not have a negative effect on the performance of domestic business groups, as one would expect, but they rather contributed to strengthen their market dominance.

More recently, a set of descriptive studies have provided new information and an updated overview of business groups in other Latin American countries: Argentina (Fracchia et al., 2010), Brazil (Aldrighi and Postali, 2010), Mexico (Hoshino, 2010) and Central American countries (Bull and Kasahara, 2012). Although some country specificities exist, these studies identify some important commonalities. In most cases, groups originated several decades ago, and their initial formation and growth was closely linked and actively supported by public policies, such as State-led industrialization strategies, public ownership, trade protection and public procurement. Business groups have traditionally had close ties to national governments and often a strong political influence on them. The extensive process of economic reforms that was undertaken in many countries in the region during the 1980s and 1990s – privatizations, trade liberalization, financial and macroeconomic stabilization – does not seem to have affected groups more than other firms. Business groups did in fact grow stronger and found new strategies to survive in the new highly competitive environment. As a result, business groups do still play today a major role in all of these economies.

Despite these recent contributions, empirical evidence on business groups in Latin America is still limited and far less extensive than it is the case for East Asian countries. On the one hand, most of the existing recent studies are descriptive in nature and do not provide insights on how the performance of business groups is affected by group-specific characteristics and strategies, such as ownership, diversification, internationalization and technological innovation. The latter is an increasingly important factor for catching up countries in the region (Castellacci and Archibugi, 2008; Castellacci, 2011), and it is therefore important to investigate business groups' capabilities and technological performance.

On the other hand, a second important research gap in this literature is that most of the existing studies focus on individual countries, and there exist very few cross-country studies comparing groups' characteristics and dynamics across countries in Latin America. This limits our ability to understand the relationships between country-specific characteristics, institutional features and firm-level performance. Specifically, cross-country analyses are important as they may provide insights on the empirical validity of the so-called *institutional voids thesis*: that business groups originate and prosper when national institutions are weak and that, correspondingly, groups performance is relatively better in countries characterized by weaker institutions than in economies with well-functioning institutional set ups (Khanna and Yafeh, 2007; Carney et al., 2011).

Khanna and Rivkin (2001) present a cross-country analysis of 14 emerging markets, which does not find any significant evidence that group-affiliated firms have a better financial performance than standalone enterprises for the four Latin American economies in the sample (Mexico, Chile, Brazil and Argentina). Khanna and Yafeh (2005) carry out a cross-country test of the institutional voids thesis, reporting no significant correlation between countries' quality of legal and financial institutions and business groups' extent and performance. These studies, taken together with the literature presented in this section, are suggestive. In Latin America, groups emerged and originally prospered through active public support and protection. Even after the wave of economic reforms in the 1990s and the related institutional upgrading, groups did not disappear or worsened their performance, but found new strategies and ways to compete, often maintaining their close ties to national authorities. This calls for an investigation of the institutional voids thesis for the case of Latin America, and an analysis of its relation to business groups' innovation strategies and performance.

3. Theory and hypotheses

The first question we investigate is whether group-affiliated firms (GAFs) are more innovative than standalone firms (SAFs). A few studies have recently extended the business groups literature to analyze this unexplored topic (Mahmood and Mitchell, 2004; Mahmood and Lee, 2004; Chang et al., 2006; Belenzon and Berkovitz, 2010). The empirical results of these works all point to a positive impact of group affiliation on innovation, due to the following channels.

First, GAFs can more easily get access to financial capital within the group when external financial markets are inefficient, and hence also reduce the uncertainties related to R&D investments. Secondly, when the country has a low level of human capital and workers' skills, GAFs may provide workers with training and more efficiently allocate labor resources internally within the group. Thirdly, when the home market is not well developed, GAFs may overcome the lack of independent suppliers and advanced users by linking to other firms of the same (vertically-integrated) group. Hence, vertical integration may partly substitute for the lack of a good home market. Relatedly, GAFs may have greater access to internal information and advanced knowledge (within-group spillovers). Fourthly, due to their established market position and distribution network, GAFs are in a better position to develop collaborations with foreign firms and MNEs, so possibly exploiting knowledge imitation and foreign spillovers.
We argue that these general arguments are highly plausible for the Latin American context, and it is therefore reasonable to point out this first hypothesis for our study:

H1: *GAFs are more innovative than SAFs*.

The second question we investigate is whether country-specific institutional factors affect firm-level innovation, and whether these effects are stronger for GAFs than for SAFs. As noted in the previous section, we intend to provide a cross-country test of the *institutional voids thesis* and assess its empirical validity within the Latin American context. In its general formulation, this thesis argues that business groups originate and prosper when national institutions are weak and that, correspondingly, groups performance is relatively better in countries characterized by weaker institutions than in economies with well-functioning institutional set ups (Khanna and Yafeh, 2007; Carney et al., 2011). This argument has recently been extended by Chang et al. (2006) to the study of business groups' innovativeness. Chang et al. (2006)'s argument is that the positive effects of group affiliation on innovation are more relevant in less developed (emerging) economies, in which groups make up for market failures and institutional weaknesses, particularly with respect to financial infrastructure, legal institutions and labor markets regulations.
We take a different point of view on this question. Our paper argues that it is not straightforward to extend the institutional voids thesis to the study of business groups' innovation activities, and that the conclusions may well be that groups' innovativeness is stronger in countries characterized by better and more efficient institutions, rather than in

economies with weaker institutional set ups. We develop and explain this argument in three steps.

First, an important and commonly shared starting point in the innovation literature is that firms' innovation investments are enabled and supported by country-level institutions (so-called national systems of innovation; Nelson, 1993; Castellacci and Natera, 2012). In particular, *financial* institutions favor private firms' access to finance, making available resources to invest in R&D; *legal* institutions and an efficient court system favor commercial transactions, contract enforcing and the protection of intellectual property rights (IPRs); and *labor market regulations* affect the pool of human resources that a firm can draw from, or determine the flexibility of the labor market and the ability of firms to hire new workers. These arguments are not only in line with the national systems of innovation literature, but are also related to the varieties of capitalism framework, which emphasizes the importance of public institutions as a supportive framework for private firms' performance and innovativeness, and the complementarities among different institutional conditions that tend to reinforce each other and make, among other things, groups as a permanent feature of emerging economies (Hall and Soskice, 2001; Schneider, 2009). We summarize this by pointing out the following general hypothesis:

H2: *Financial, legal and labor market institutions are important factors for firms' innovation*.

Secondly, we ask whether country-level institutions are more relevant for the innovativeness of GAFs than for SAFs. Our standpoint is that – within each country – financial, legal and labor market institutions are more supportive of innovative activities for GAFs than SAFs. The reason is that GAFs are in general better established in the market, and have a greater propensity and capability to undertake innovation activities (as pointed out by H1). Hence, the lack of well-functioning institutions supporting innovations will affect GAFs relatively more than SAFs. In other words, GAFs are more exposed to the lack of innovation infrastructures than SAFs since they have higher innovation propensity. For instance, if legal institutions in a country are weak, the lack of IPRs protection and efficient contract enforcing mechanisms will penalize GAFs more strongly than SAFs since the former have R&D investments more frequently than the latter.

H3: *Within each country, financial, legal and labor market institutions are more important factors for the innovativeness of GAFs than SAFs*.

Thirdly, what are the cross-country implications of this argument? Since GAFs are more engaged in innovation than SAFs (H1), and given that institutional weaknesses will affect the former more than the latter (H3), the implication of our argument is that, across countries, the better the institutional system, the stronger will be the innovation performance of GAFs as compared to that of SAFs. Our hypothesis is then different from the point made by Chang et al. (2006). While we agree that GAFs may have strong internal capabilities and resources and hence partly make up for weak or inefficient institutions, we also argue that firm-level innovative activities are greatly supported by country-level infrastructures and national systems of innovation: the stronger and more efficient these country-specific support mechanisms, the higher the innovativeness of business groups.

H4: *Across countries, the difference between the innovativeness of GAFs and SAFs is stronger in countries with better financial, legal and labor market institutions*.

4. Data and indicators

Our empirical analysis makes use of the *World Bank Enterprise Surveys* (WBES) database. This is a rich and extensive survey dataset of several thousand business firms in nearly all developing countries, providing information on their characteristics, strategies, economic performance, as well as their perceptions of the institutional, policy and economic environment in which they operate. The WBES follows a stratified random sampling with replacement, based on firm size, business sector and geographic region as the main strata, which ensures representativeness of the results within each country. The survey questionnaire follows a standard template, in order to ensure cross-country comparability of the results.[1]

We focus on the most recent wave of the WBES, the one referring to the period 2010-2011. A key characteristic of the WBES dataset does now contain information on firms' ownership. From this information, we are able to identify which firms in the database are part of a domestic group (GAFs), and distinguish these from the group of standalone firms (SAFs). This information is very valuable from the point of view of the business groups literature. So far, group identification has in fact been a controversial and difficult task for empirical works in this field (Khanna, 2000; Yafeh, 2005), and the information on group affiliation has often

[1] For a detailed description of the dataset and its methodology, see the WBES page: www.enterprisesurveys.org.

been limited to enterprises within a specific country. The present paper, by making use of the new information available in the WBES 2010, suggests a new avenue for empirical analyses in the field, making it possible to compare business group characteristics, strategies and performance for several thousand firms across the whole developing world.

Our study focuses on 20 Latin American countries, covering nearly the whole region.[2] The whole sample contains a total number of around 13 000 firms, covering all sectors of economic activity (agriculture, manufacturing and services). However, since one of the variables of our interest, technological innovation, is only available for firms in the manufacturing sector, we eventually narrowed down our sample to a total number of around 6500 enterprises.

The empirical analysis makes use of the following 12 indicators. Table 1 presents some descriptive statistics for the whole sample, table 2 reports the mean of the variables for each country, and table 3 shows the coefficients of correlation among these indicators.

GAF: Group-affiliated firm. Dummy variable indicating whether an enterprise is part of a domestic group. This indicator has been obtained by interacting (multiplying) two dummy variables of the WBES questionnaire: (1) the one reporting whether "the establishment is part of a larger firm" (question A.7); (2) the one indicating whether "the firm is owned by private domestic individuals, companies or organizations".[3] This variable is then able to distinguish two types of enterprises in our sample: domestic group-affiliated firms (GAFs) and domestic standalone firms (SAFs). Table 1 shows that 12,4% in our sample are GAFs, and table 2 indicates that there is substantial variability in the presence of GAFs across countries in the region, ranging from only 1% in Colombia to more than 20% in Argentina and Bolivia.

INNO: Innovation. Dummy variable indicating whether an enterprise has carried out R&D investments in the period (question LAC.E6). This is a standard indicator of technological innovation, which is the predominant type of innovation for firms in manufacturing industries. R&D investments are not only important because they lead to the introduction of brand new products and processes, but also because they increase a firm's capability to imitate external advanced knowledge (Cohen and Levinthal, 1990). The indicator is therefore useful to

[2] The list of countries in the sample is available in table 2. We were forced to disregard Brazil from our analysis, since the Brazilian questionnaire does not contain any information on firms' innovation activities.

[3] This second variable has been obtained from question B.2a, assuming that a firm is domestically owned if at least 50% of its ownership belongs to private domestic individuals, companies or organizations.

measure Latin American firms' innovation propensity as well as their imitation ability. On average, 45% of manufacturing firms in the sample have undertaken R&D investments in the period.[4]

SIZE: Size of the firm. Categorical indicator taking three possible values: 1 if the firm has between 5 and 20 employees; 2 if it has between 20 and 100 workers; 3 if it has more than 100 employees (question A.6 of the WBES survey). The average firm size category in our sample is 2 (between 20 and 100 workers), and the cross-country variability of this indicator is low: in all of the Latin American countries in the sample, small and medium-sized enterprises constitute the bulk of the business population.

AGE: Age of the enterprise. Number of years since the establishment began operations (question B.5). The variable ranges from 0 to 340 years, and the mean value is approximately 28 years. Argentina, Chile and Uruguay are the countries with the oldest average firm (around 34 years).

QUALITY: Quality certification. Dummy variable indicating whether the firm has "an internationally-recognized quality certification, such as ISO 9000, 9002 or 14000" (question B.8). On average 28% of enterprises in the sample report to have obtained quality certification (highest percentage is 38% in Argentina and Chile).

EDUC: Education level. "Average number of years of education of a typical permanent full-time production worker employed in the establishment" (question L.9a). The mean value in the region is 10 years. Central American countries do mostly score below the average on this indicator.

ICT: ICT infrastructure. Dummy variable reporting whether a firm has "a high-speed Internet connection on its premises" (question C.23). A large majority of firms in the sample (87%) report to have good Internet infrastructure, although the variable differs substantially

[4] In addition to this R&D variable, we have also used a dummy variable indicating whether the firm has introduced a new product in the period (NEW_PROD). The new product dummy measures the outcome of innovation. It is interesting to use this variable, along with the R&D dummy, in order to see whether the main patterns investigated in the paper also hold for the innovation performance of firms in addition to their innovation propensity.

across countries – ranging from 95% in Argentina, Colombia and Ecuador to below 65% in most Central American countries.

DIVERSIF: Product diversification. Percentage of total sales represented by other products than the firm's main product (question D.1a3). The mean value of this variable in the sample is 30%, although less developed economies in Central America have on average a lower degree of product diversification than more advanced countries in South America.

URBAN: Urban density. Indicator reporting the size of the city in which the firm is located. The variable is categorical and takes five possible values: 1 if it is a town with less than 50000 inhabitants; 2 between 50000 and 250000 people; 3 between 250000 and 1 million; 4 if it is a city with population over 1 million, but not a capital city; 5 if it is a capital city. The indicator is obtained from question A.3, and it is used as a proxy for urban density and agglomeration economies.

FINANCE: Financial system. Variable indicating whether "access to finance – which includes availability and cost, interest rates, fees and collateral requirements – is an obstacle to the current operations of the firm" (question K.30). The variable is categorical, ranging from a value of 0 (no obstacle) to 4 (very severe obstacle).

LEGAL: Legal system. Variable indicating whether legal courts represent an obstacle to the current operations of the enterprise (question J.30). The variable is categorical, ranging from a value of 0 (no obstacle) to 4 (very severe obstacle).

LABOR: Labor regulations. Variable indicating whether "labor regulations are an obstacle to the current operations of the firm" (question L.30). The variable is categorical, ranging from a value of 0 (no obstacle) to 4 (very severe obstacle).

These three last variables, FINANCE, LEGAL and LABOR, represent our indicators of country-specific institutional conditions. They are measured at the firm-level, indicating private firms' perceptions of the institutional environment in which they operate. The country average of these variables provides a measure of the institutional and regulatory set up that characterizes each national economy.

< Tables 1, 2 and 3 here >

5. Econometric model and methods

The econometric analysis seeks to estimate the relationship between group affiliation (GAF dummy) and firms' innovation (INNO dummy), and how this relationship is affected by country-specific institutional factors. As noted in previous research, one main issue that arises in this context is that some firm-specific characteristics (measured or unobservable) may affect both the probability that a firm is a GAF *and* its performance. Khanna (2000: 752) calls this issue "winner picking": if a firm has a successful performance, it is more likely that it will be invited to join a business group. A similar issue may arise in our study. Some firm-specific characteristics may in principle affect both the probability that a firm is selected to take part in a group and its ability or propensity to innovate. If this is the case, a problem of selection bias arises, due to the fact that firms self-select into two different categories, GAFs and SAFs, and this will affect the estimation of the group-innovation relationship.

In order to properly take account of this issue, we use a two-equation approach and model both the probability that an enterprise is a GAF (equation 1) and its innovation propensity (equation 2). The first equation studies the factors that may determine why a firm is selected to take part in a group, whereas the second equation estimates the determinants of its innovation propensity. These two equations form a recursive system of equations, since the dependent variable in equation 1 (GAF dummy) is included among the explanatory variables in equation 2. The full model specification is the following:

$$GAF_i = \alpha_1 + \beta_1\, SIZE_i + \gamma_1\, AGE_i + \delta_1\, QUALITY_i + \zeta_1\, DIVERSIF_i + \eta_1\, LEGAL_i + \\ + \theta_1\, FINANCE_i + \kappa_1\, LABOR_i + \lambda_1\, S_i + \rho_1\, C_i + \varepsilon_{i1} \quad (1)$$

$$INNO_i = \varsigma_2 + \omega_2\, GAF_i + \beta_2\, SIZE_i + \gamma_2\, AGE_i + \delta_2\, QUALITY_i + \sigma_2\, EDUC_i + \tau_2\, ICT_i + \\ + \eta_2\, LEGAL_i + \theta_2\, FINANCE_i + \kappa_2\, LABOR_i + \varphi_2\, URBAN_i + \psi_2\, INTERACT_i + \lambda_2\, S_i + \rho_2\, C_i + \\ + \varepsilon_{i2} \quad (2)$$

In both equations, the explanatory variables include a set of firm-level characteristics (size, age, quality, product diversification, education level, ICT infrastructures, urban density), three country-level factors (legal, financial and labor market institutions), some interaction

variables (defined below), plus the full set of sector and country dummies (S_i and C_i respectively).

All the firm-specific control variables are expected to take a *positive* sign in the estimations: the firm's probability to be part of a group (equation 1) and its innovation propensity (equation 2) are assumed to be positively related to the enterprise's size, age, product quality, degree of product diversification, human capital, ICT infrastructures, and geographical (urban) location. The GAF variable in equation 2 is also assumed to be *positive*. As stated in hypothesis 1, GAFs are expected to have higher innovation propensity than SAFs.

The role of the three country-level factors – legal, financial and labor market institutions – and their interactions with firm-specific factors, was pointed out by hypotheses 2, 3 and 4 (see section 3). Hypothesis 2 postulates a *positive* relationship between these three institutional factors and the firm's innovation propensity in equation 2.

Hypothesis 3 points out that these institutional characteristics are more important factors for the innovativeness of GAFs than SAFs. We test this by creating three interaction variables, each of which interacts the GAF dummy with the three country-level institutional factors. These three interaction variables are included in equation 2 and are expected to have a *positive* sign in the estimations.

Finally, hypothesis 4 argues that, across countries, GAFs' innovativeness is higher in countries with better financial, legal and labor market institutions. We also test this by introducing six additional interaction terms in equation 2. These interaction variables are constructed as follows. First, for each of the three institutional variables, we carried out a simple hierarchical cluster analysis and divided the 20 countries in the sample into two groups: those whose institutional system is above average and those below average. Secondly, for each institutional variable, we created two interaction variables, one between the GAF dummy and the "above average" country group dummy, and one between GAF and the "below average" country group dummy. Put it simply, these interaction variables test the hypothesis that the relationship between GAF and INNO is piecewise linear: according to hypothesis 4, we expect all of these interaction terms to have a positive sign, but we also expect the estimated coefficient to be higher for countries with a good institutional system than for economies with a weaker institutional set up.[5]

[5] A recent debate in the applied econometrics literature discusses the use and interpretation of interaction terms in non-linear models such as logit and probit. Ai and Norton (2003) opened this debate and criticized the common interpretation of interaction terms in non-linear models. Greene (2010) and Kolasinski and Siegel (2010) have recently responded to this criticism and shown that the usual interpretation of interaction effects is reasonable and more informative than the method proposed by Ai and Norton.

As noted above, one important econometric issue that arises in the estimation of this model is so-called *self-selection into categories*: firms self-select into two different categories, GAFs and SAFs, and this is likely to affect the estimation of the group-innovation relationship. Since firm-specific characteristics may affect both the probability that a firm is selected to take part in a group and its innovation propensity, the variable GAF in equation 2 is likely to be correlated with the error term, and its estimated elasticity does arguably overestimate the effect of group affiliation on innovation. Our strategy to cope with this issue is twofold.

First, we use *propensity score matching* (PSM) estimations. The basic idea of the matching approach is to select a group of SAFs firms in the sample which are as similar as possible to the corresponding group of GAFs (conditional on a set of firm-level characteristics). By comparing (matching) the two groups of enterprises, it is possible to obtain an unbiased estimate of the effect of group affiliation on innovation (Caliendo and Kopeinig, 2008).

The PSM method proceeds in three steps. First, it estimates the probability that a firm is a GAF, using as covariates variables that affect both the GAF dummy and the innovation dummy. This is a simple probit estimation of equation 1. Secondly, it creates two similar groups of firms, GAFs and SAFs, based on the propensity score obtained in the first step. Thirdly, it compares the mean of the two groups. This estimated difference (so-called *average treatment effect on the treated*, ATT) provides an unbiased estimate of the effect of group affiliation on innovation propensity.

The second approach we use is to estimate equations 1 and 2 through a *recursive bivariate probit* method, in which both equations are simultaneously estimated and the endogeneity of the GAF variable in equation 2 is properly handled by the way the model is estimated. The recursive bivariate probit is a seemingly unrelated regression model with correlated disturbances, in which the dependent variable of the first equation appears on the righ-hand-side of the second equation. The model is estimated by MLE. Greene (2003: 715-716) points out that in such a model the endogeneity of one of the RHS variables of the second equation can be neglected because this term does not affect the maximization of the log-likelihood (differently from what it would be the case in a linear recursive model not estimated by MLE).

6. Results

We first present the results of propensity score matching (table 4), and then the estimations of our two-equation system through the recursive bivariate probit model (tables 5 and 6). As explained in the previous section, the PSM method selects a group of SAFs firms in the sample which are as similar as possible to the corresponding group of GAFs (conditional on a set of firm-level characteristics) and, by comparing the two groups of enterprises, it provides an unbiased estimate of the effect of group affiliation on innovation.

Table 4 presents the PSM results. We compare four sets of results: for two different model specifications (with and without the three country-level variables), and for two different matching methods (K-nearest neighbors and kernel matching). These four sets of results are closely in line with each other. After creating two similar groups of firms (GAFs *versus* SAFs), conditional on the set of firm-level characteristics outlined in equation 1, a comparison of the two indicates that GAFs have on average an innovation propensity of nearly 59%, whereas the mean for the SAF control group is around 50%. The difference between the two (the ATT, i.e. the *average treatment effect on the treated*) is around 9%. This is our unbiased estimate of the effect of group affiliation on innovation propensity. These results provide support for our first hypothesis (H1), indicating that in our sample of firms operating in Latin America the innovation propensity of GAFs is 9% higher than that of SAFs.[6]

< Table 4 here >

We then shift the focus to the results of the estimations of our two-equation system through the recursive bivariate probit model. Equation 2 is the specification of our main interest, investigating the determinants of firms' innovation propensity and providing tests of the hypotheses outlined in section 3. On the other hand, the estimation of equation 1, investigating the determinants of the probability that a firm is a GAF, simply represents a first stage in the econometric analysis but does not provide any direct information on the hypotheses of our interest. We therefore report these results in the Appendix table A1, but will not comment them further here.

[6] We have also repeated the same PSM exercise with a different dependent variable, in order to test whether these results also hold for the indicator "NEW_PROD" (a dummy variable indicating whether the firm has introduced a new product in the period). The results for this innovation outcome variable are closely in line with those for the R&D variable: the estimated ATT is in the range between 8.6 and 9.3%. Therefore, our main result that GAFs are more innovative than SAFs does not only hold for the innovative propensity of firms, but it does also extend to their technological performance.

Table 5 reports the results of the estimation of equation 2. Before discussing the results of these tests, it is interesting to look at the estimates for the firm-specific (control) variables included in equation 2. As expected, four of the firm-level factors matter for the innovativeness of enterprises in Latin America. Firms are more likely to be innovators the greater their size, product quality and ICT infrastructure. Innovation propensity is also positively related to the size of the urban location in which firms are located, reflecting urban density and agglomeration economies. By contrast, differently from our expectations, two firm-level characteristics are not significantly related to the R&D dummy. Firm age and its human capital level (number of education years of full-time permanent employees) do not in fact seem to have an effect on the probability that an enterprise undertakes R&D investments.

A key explanatory variable in equation 2 is the GAF dummy, which tests for our first hypothesis that group-affiliated firms are more innovative than standalone enterprises (H1). In line with the results of propensity score matching estimations, this hypothesis receives strong and significant support: table 5 shows that the estimated coefficient of the GAF dummy is positive and significant.

Our second hypothesis argues that country-level institutions (financial, legal and labor market) are important for the innovativeness of firms in the region (H2). This is a general proposition that it is expected to hold for all firms in the sample and does not specifically refer to group-affiliated enterprises. Table 5 provides empirical support for this hypothesis. The variables FINANCE, LEGAL and LABOR are all positively and significantly related to the innovation dummy dependent variable. LABOR is the factor that turns out to have the strongest estimated coefficient, providing evidence that extensive and inefficient labor market regulations may prove to be an important obstacle to business firms' activities and performance (Botero et al., 2004; Schneider, 2009).

Hypothesis 3 postulates a positive relationship between financial, legal and labor market institutions, on the one hand, and GAFs' innovativeness, on the other (H3). As explained in the previous section, we test this proposition by introducing three variables that interact the GAF dummy with each of the country-specific institutional variables. The interaction LEGAL * GROUP turns out to be positive and significant (see columns 7 and 9), whereas the other two are not significant. This result provides partial support for our third hypothesis, and suggests in particular that legal factors are more important for the innovativeness of GAFs than for standalone firms. Our interpretation of this result is that, if legal institutions (legal courts) in a country are weak, the lack of IPRs protection and efficient contract enforcing

mechanisms will penalize GAFs more strongly than SAFs, since the former are more engaged in R&D activities than the latter (as shown by H1).

Table 6 reports the results of tests of hypothesis 4, which investigates the cross-country implication of the previous patterns. H4 states that, across countries, the difference between the innovativeness of GAFs and SAFs is stronger in countries with better financial, legal and labor market institutions. This proposition is tested in regressions 11, 12 and 13, which make use of a piecewise linear specification in which the GAF coefficient is allowed to differ across two country groups: one characterized by stronger and more efficient financial, legal and labor market institutions, and the other with a weaker and less efficient institutional set up (see section 5 for a definition of the six interaction variables that are inserted in regressions 11, 12 and 13). As expected, the six interaction terms that are used to test H4 are all positive and significant and, in particular, they show that the effect of group affiliation on innovation is stronger for countries with a good institutional system than for economies characterized by weaker institutional conditions.

In short, we find that, across countries in Latin America, the innovativeness of GAFs is *higher* for countries with *better* legal, financial and labor market systems. As discussed in section 3, our interpretation of this pattern is that firm-level innovative activities are greatly supported by country-level infrastructures and national systems of innovation: the stronger and more efficient these country-specific support mechanisms, the higher the innovativeness of business groups.

< Tables 5 and 6 here >

To assess the robustness of this result, it is important to consider two questions. (1) Is this cross-country result affected by the fact that our indicators of country-specific institutional conditions (FINANCE, LEGAL, LABOR) are constructed on the basis of private firms' own perceptions of the institutional environment in which they operate? (2) Does this result indicate a specific pattern only valid for Latin American countries, rather than all emerging economies worldwide?

Table 7 reports some descriptive evidence providing a negative answer to both of these questions. The table presents the correlation between the innovativeness of GAFs (average for each country) and a set of country-level indicators of financial, legal and labor market institutions, along with other structural characteristics (human capital, physical and ICT infrastructures). As indicated in the last column of the table, these indicators are taken from

commonly available data sources (e.g. World Bank WDI, Heritage Foundation, Botero et al., 2004). These variables are not constructed on the basis of the enterprises' own perceptions about their institutional environment, but based on the independent assessment and calculations made by these data providing agencies. Further, these indicators are available for a large cross-section of 75 emerging economies worldwide, so that we may compare patterns in Latin America with those elsewhere in the developing world.

The correlation coefficients reported in table 7 all confirm the results of the test of hypothesis 4 carried out on the WBES survey dataset. Across countries, the innovativeness of business groups is higher for national economies with a more developed financial infrastructure, more efficient legal institutions, and a less regulated and more flexible labor market. Besides, groups' innovativeness is also positively related to countries' human capital, physical and ICT infrastructures. These correlation patterns hold for both the Latin American sample and the larger sample including all emerging economies. Therefore, hypothesis 4 does not indicate a specific pattern only valid for Latin American countries, but rather a general regularity characterizing emerging economies worldwide.

< Table 7 here >

7. Discussion and conclusions

The paper has carried out an empirical analysis of the innovative activities of business groups in Latin America. The study has compared the innovativeness of group-affiliated firms and standalone enterprises, and it has then investigated how country-specific institutional factors – financial, legal, and labor market institutions – affect the group-innovation relationship. The empirical analysis has made use of the extensive dataset made available by the most recent wave of the WBES (period 2010-2011), providing a rich set of information on 6500 manufacturing firms in 20 Latin American countries. The econometric results point out two major conclusions, which we summarize here along with a brief discussion of their policy implications.

The first main conclusion is that GAFs are more innovative than SAFs. After controlling for a large set of firm- and country-specific characteristics, and correcting for the possible self-selection bias due to the winner-picking mechanism, our econometric analysis estimates that the innovation propensity of GAFs is about 9% higher than that for SAFs. The result of a

positive effect of group affiliation on innovation is in line with the other few empirical studies analyzing this topic (Mahmood and Mitchell, 2004; Mahmood and Lee, 2004; Chang et al., 2006; Belenzon and Berkovitz, 2010).

An implication of this result is that, by fostering the technological dynamics of the national system in which they operate, business groups have an important welfare-enhancing function in emerging economies, since they contribute to the process of domestic capability building and economic transformation through knowledge spillovers. At the same time, however, this also implies that standalone firms, which represent a great majority of the business population in Latin America, are losing ground and progressively becoming less competitive than the relatively small number of business groups that dominate domestic markets in these emerging economies. This type of diverging dynamics may have negative effects on the income distribution and further exacerbate income and social inequalities that do currently represent a major issue in Latin America. In order to counteract this diverging dynamics, national authorities should more systematically provide innovation policy support to standalone enterprises, targeting their technological capabilities, human capital as well as their access to financial capital and physical and ICT infrastructures.

The second main conclusion of our empirical analysis is that, across countries, the innovativeness of GAFs is higher for national economies with a better institutional system than for countries with a less efficient institutional set up. Financial, legal and labor market institutions provide an important infrastructure sustaining business firms' innovation activities, and this enhancing effect is stronger for group-affiliated firms in well-functioning and well-organized national systems of innovation. While it is true that GAFs may have strong internal capabilities and resources and hence partly make up for weak or inefficient institutions, as shown in previous research, we also find that firm-level innovative activities are greatly supported by country-level infrastructures and national systems of innovation: the stronger and more efficient these country-specific support mechanisms, the higher the innovativeness of business groups.

An implication of this result is that institutional changes and economic reforms intended to make domestic markets more open, competitive and efficient – such as the extensive wave of privatizations, trade liberalization, financial and macroeconomic stabilization undertaken in many Latin American countries during the 1980s and 1990s – will not necessarily drive business groups out of the market, as it is sometimes argued in the literature. By contrast, the effect of institutional changes and market liberalization is often that business groups, by exploiting their superior capabilities and dominant market position, are able to develop new

strategies and find new market niches, whereas smaller standalone firms are more likely to loose market shares and shrink (Khanna and Palepu, 2000). The Latin American case analyzed in this paper does on the whole suggest that, when focusing on business groups innovation activities, a process of creative destruction is in place, according to which larger and well established domestic firms survive whereas smaller and less competitive enterprises are eventually driven out of the market. It is this evolutionary process – driven by competition, selection and innovation – that explains business dynamics in contemporary Latin America.

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Table 1: Descriptive statistics – Whole sample

Variable	Mean	Std. Dev.	Min	Max	Obs.
GAF	0.124	0.329	0	1	6573
INNO	0.451	0.497	0	1	6573
SIZE	2.004	0.809	1	3	6573
AGE	27.84	21.34	0	340	6535
QUALITY	0.280	0.449	0	1	6263
EDUC	10.33	3.95	0	100	6059
ICT	0.868	0.338	0	1	6401
DIVERSIF	30.36	26.14	1	100	6504
URBAN	1.992	1.26	1	5	6573
FINANCE	1.622	1.25	0	4	6504
LEGAL	1.625	1.37	0	4	6369
LABOR	1.723	1.21	0	4	6549

Table 2: Descriptive statistics – Mean values by country

	Argentina	**Bolivia**	**Chile**	**Colombia**	**Costa Rica**	**Dominican Republic**	**Ecuador**	**El Salvador**	**Guatemala**	**Guyana**
GAF	0.212	0.266	0.183	0.011	0.079	0.065	0.075	0.192	0.065	0.222
INNO	0.593	0.667	0.424	0.573	0.442	0.328	0.483	0.416	0.388	0.486
SIZE	1.958	2.109	1.992	2.034	1.846	2.155	2.025	2.001	1.884	1.986
AGE	34.59	29.92	32.77	25.08	26.24	21.95	31.59	26.53	26.00	27.93
QUALITY	0.383	0.315	0.379	0.337	0.199	0.241	0.339	0.252	0.133	0.303
EDUC	10.60	11.828	11.46	10.61	8.739	9.541	11.38	10.00	8.204	-
ICT	0.948	0.857	0.882	0.953	0.860	0.917	0.958	0.840	0.745	-
DIVERSIF	37.24	31.54	30.55	32.64	31.75	35.73	29.99	29.42	28.47	22.97
URBAN	2.930	2.458	1.539	1.401	3.303	1.664	1.942	3.072	1.434	4.125
FINANCE	2.037	1.607	1.410	1.937	2.182	1.553	1.479	2.048	1.572	1.267
LEGAL	2.083	1.723	1.092	1.383	1.297	1.633	2.060	1.823	2.047	1.289
LABOR	2.512	2.092	1.746	1.745	1.556	1.652	1.608	1.080	1.413	0.833
Observations	791	120	775	705	326	122	120	125	355	72

	Honduras	**Jamaica**	**Mexico**	**Nicaragua**	**Panama**	**Paraguay**	**Peru**	**Suriname**	**Uruguay**	**Venezuela**
GAF	0.100	0.074	0.146	0.079	0.087	0.118	0.133	0.026	0.044	0.153
INNO	0.326	0.272	0.369	0.262	0.087	0.559	0.559	0.040	0.397	0.317
SIZE	1.826	1.901	2.263	1.865	1.826	2.051	1.960	1.547	1.828	1.882
AGE	24.81	34.07	24.85	27.78	24.48	27.47	22.62	21.15	34.46	26.13
QUALITY	0.234	0.217	0.243	0.242	0.225	0.282	0.273	0.133	0.191	0.212
EDUC	8.393	11.29	9.757	8.286	11.66	10.39	11.73	-	8.964	10.59
ICT	0.637	0.647	0.885	0.516	0.583	0.898	0.906	-	0.814	0.929
DIVERSIF	24.99	18.47	28.33	22.55	18.04	30.15	32.65	16.34	30.08	24.10
URBAN	2.193	1.719	1.897	2.222	1.774	2.381	1.405	5.000	1.433	1.753
FINANCE	1.671	1.775	1.568	1.306	0.817	1.144	1.323	2.093	1.327	1.287
LEGAL	2.083	1.205	1.775	1.836	1.330	1.885	1.880	2.066	0.741	1.445
LABOR	1.440	0.871	1.598	1.219	0.843	1.703	1.671	1.920	1.941	2.035
Observations	150	121	1152	126	115	118	760	75	360	85

Table 3: Correlation coefficients

	GROUP	INNO	SIZE	AGE	ICT	QUALITY	EDUC	DIVERSIF	URBAN	FINANCE	LEGAL	LABOR
GAF	1.000											
INNO	0.096	1.000										
SIZE	0.145	0.241	1.000									
AGE	0.089	0.099	0.247	1.000								
ICT	0.099	0.243	0.294	0.096	1.000							
QUALITY	0.109	0.252	0.380	0.183	0.180	1.000						
EDUC	0.067	0.064	0.048	0.036	0.073	0.099	1.000					
DIVERSIF	0.053	0.141	0.085	0.133	0.095	0.084	0.053	1.000				
URBAN	0.018	0.023	- 0.077	- 0.004	- 0.048	0.020	- 0.035	-0.023	1.000			
FINANCE	- 0.045	0.006	- 0.112	- 0.083	- 0.024	- 0.096	- 0.034	0.003	0.051	1.000		
LEGAL	0.024	0.007	0.053	0.005	0.028	0.019	- 0.025	0.039	0.010	0.243	1.000	
LABOR	0.038	0.112	0.079	0.083	0.118	0.027	0.000	0.061	0.037	0.266	0.384	1.000

Table 4: Propensity score matching (PSM) estimation results.

	Full model specification (as in equation 1)		**Model excluding the three country-level variables**	
Matching method	K-nearest neighbors	Kernel	K-nearest neighbors	Kernel
Average GAF (treated)	0.589	0.589	0.584	0.584
Average SAF (controls)	0.509	0.496	0.498	0.495
Difference (ATT)	0.080	0.093	0.086	0.089
Standard error	0.021***	0.020***	0.020***	0.020***
Number of GAF (treated)	733	733	756	756
Number of SAF (controls)	5146	5146	5375	5375
Mean bias: Before matching	15.6%	15.6%	16.2%	16.2%
Mean bias: After matching	3.3%	3.4%	2.2%	2.7%

Legend: GAF: group-affiliated firms; SAF: Standalone firms; ATT: average treatment effect on the treated

Table 5: Estimation results for equation 2. Dependent variable: INNO. Estimation method: bivariate probit.

		(6)	**(7)**	**(8)**	**(9)**
H1	GAF	0.676 (2.08)**	0.531 (1.53)	0.669 (1.91)*	0.596 (1.68)*
	SIZE	0.233 (7.29)***	0.237 (7.40)***	0.234 (7.30)***	0.236 (7.34)***
	AGE	-0.0003 (0.33)	-0.0003 (0.35)	-0.0002 (0.31)	-0.0003 (0.33)
	ICT	0.708 (10.53)***	0.709 (10.54)***	0.709 (10.54)***	0.708 (10.50)***
	QUALITY	0.368 (7.52)***	0.372 (7.62)***	0.369 (7.54)***	0.371 (7.56)***
	EDUC	0.003 (0.66)	0.003 (0.68)	0.003 (0.66)	0.003 (0.69)
	URBAN	0.047 (2.66)***	0.048 (2.68)***	0.047 (2.65)***	0.047 (2.67)***
H2	FINANCE	0.026 (1.55)	0.027 (1.70)*	0.027 (1.72)*	0.027 (1.64)
	LEGAL	0.026 (1.73)*	0.018 (1.15)	0.026 (1.72)*	0.017 (1.05)
	LABOR	0.049 (2.78)***	0.048 (2.73)***	0.048 (2.62)***	0.052 (2.81)***
H3	FINANCE * GAF	0.014 (0.31)			-0.008 (0.16)
	LEGAL * GAF		0.069 (1.74)*		0.086 (1.88)*
	LABOR * GAF			0.005 (0.12)	-0.038 (0.74)
	Industry dummies	Yes	Yes	Yes	Yes
	Country dummies	Yes	Yes	Yes	Yes
	LR χ^2	1459.54***	1456.58***	1456.50***	1460.15***
	Observations	5466	5466	5466	5466

Table 6: Estimation results for equation 2. Dependent variable: INNO. Estimation method: bivariate probit.

		(10)	**(11)**	**(12)**	**(13)**
H1	GAF	0.683 (2.08)**			
	SIZE	0.234 (7.31)***	0.234 (7.31)***	0.233 (7.29)***	0.233 (7.29)***
	AGE	-0.0002 (0.31)	-0.0003 (0.30)	-0.0003 (0.30)	-0.0003 (0.30)
	ICT	0.709 (10.54)***	0.709 (10.53)***	0.708 (10.53)***	0.708 (10.53)***
	QUALITY	0.369 (7.54)***	0.369 (7.55)***	0.368 (7.51)***	0.368 (7.51)***
	EDUC	0.003 (0.66)	0.003 (0.66)	0.003 (0.66)	0.003 (0.66)
	URBAN	0.047 (2.65)***	0.047 (2.64)***	0.047 (2.63)***	0.047 (2.63)***
H2	FINANCE	0.027 (1.72)*	0.027 (1.72)*	0.028 (1.73)*	0.028 (1.73)*
H2	LEGAL	0.026 (1.74)*	0.026 (1.75)*	0.026 (1.74)*	0.026 (1.74)*
H2	LABOR	0.048 (2.77)***	0.048 (2.76)***	0.048 (2.76)***	0.048 (2.76)***
H4	GAF * FINANCE GOOD		0.693 (2.09)**		
H4	GAF * FINANCE BAD		0.672 (2.02)**		
H4	GAF *LEGAL GOOD			0.732 (2.13)**	
H4	GAF * LEGAL BAD			0.684 (2.11)**	
H4	GAF *LABOR GOOD				0.732 (2.13)**
H4	GAF * LABOR BAD				0.684 (2.11)**
	Industry dummies	Yes	Yes	Yes	Yes
	Country dummies	Yes	Yes	Yes	Yes
	Observations	5466	5466	5466	5466

Table 7: Coefficients of correlation between GAFs' innovativeness and country-specific institutional conditions.

Country characteristics	Variable	Whole sample (N=75)	Latin America (N=20)	Definition of variable	Source
Financial institutions	FINANCE FREEDOM	+ 0.225	+ 0.166	Freedom of finance	Heritage Foundation
	STOCKS TRADED	+ 0.055	+ 0.046	Stocks traded, % of GDP	World Bank, WDI
Legal institutions	QUALITY OF INSTITUTIONS	+ 0.178	+ 0.044	Corruption perception index (0: high corr..; 10: low corr.)	Transparency International
	FREEDOM OF PRESS	+ 0.217	+ 0.197	Freedom of press index	Reporters Without Borders
Labor market institutions	LABOR UNION POWER	- 0.076	- 0.597	Index measuring the statutory protection and power of unions	Botero et al. (2004)
	COLLECTIVE DISPUTES	- 0.027	- 0.596	Index measuring the protection of workers during collective disputes	Botero et al. (2004)
Other structural characteristics	HUMAN CAPITAL	+ 0.250	+ 0.344	Mean years of schooling	World Bank, WDI
	PHYISICAL INFRASTRUCTURE	+ 0.201	+ 0.097	Electric power consumption	World Bank, WDI
	ICT INFRASTRUCTURE	+ 0.249	+ 0.620	Internet users per 1000 people	World Bank, WDI

Appendix

Table A1: Estimation results for equation 1. Dependent variable: GAF. Estimation method: bivariate probit.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
SIZE	0.237 (7.17)***	0.233 (7.05)***	0.237 (7.16)***	0.237 (7.14)***	0.231 (6.94)***
AGE	0.002 (1.74)*	0.002 (1.68)*	0.002 (1.74)*	0.002 (1.74)*	0.002 (1.64)
QUALITY	0.173 (3.14)***	0.167 (3.04)***	0.173 (3.14)***	0.173 (3.14)***	0.167 (3.04)***
DIVERSIF	0.003 (2.86)***	0.003 (2.94)***	0.003 (2.86)***	0.002 (2.86)***	0.003 (2.93)***
FINANCE		-0.037 (1.90)*			-0.043 (2.06)**
LEGAL			0.003 (0.20)		0.010 (0.55)
LABOR				0.001 (0.07)	0.08 (0.36)
Industry dummies	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes
LR χ^2	1452.19***	1455.81***	1452.23***	1452.19***	1456.48
Observations	5466	5466	5466	5466	5466